Mr. Michael T. Davis WLPCS Calculus	Sections 1.1 & 1.2 Quiz September 14, 2017

Name: Solutions / Answers out of 69 points

Directions: Try each problem without your calculator, then use your calculator ONLY if you feel you have truly tried everything possible without your calculator.

1. Line A has equation $y+10=\frac{3}{2}(x-11)$. Line B contains the point $(-6,4)$ and is perpendicular to line A. Determine an equation for line B in all three forms: point-slope form, slope-intercept form and general (standard) form. (5 pts)

$y-4=-\frac{2}{3}(x+6)$ ✓

$y=-\frac{2}{3}x-4+4$

$y=-\frac{2}{3}x$ ✓

$3y=-2x$

$2x+3y=0$ ✓

2. Identify the domain and range of the function $g(x)=e^x-4$. (5 pts)

This is an exponential function with a horizontal asymptote.

D: $(-\infty,\infty)$

R: $(-4,\infty)$

3. Identify the domain and range of the function $g(x)=\sqrt{x-6}$. (5 pts)

This a square root graph

$x-6\geq 0$

$x\geq 6$

D: $[6,\infty)$

R: $[0,\infty)$

4. Identify the domain and range of the function $k(x)=x^2-6x$. (5 pts)

This is a quadratic function with a parabolic graph with vertex $(3,-9)$.

D: $(-\infty,\infty)$

R: $[-9,\infty)$

5. Graph $-2x+3y=-12$ (plot several points and draw your line neatly). (5 pts)

If $x=0$, then $-2(0)+3y=-12$

$0+3y=-12 \quad 3y=-12 \quad y=-4$

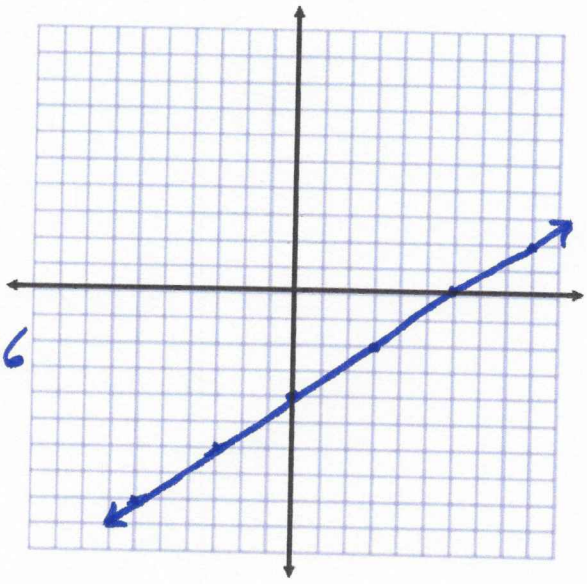
$(x,y)=(0,-4)$ y-intercept

If $y=0$, then $-2x+3(0)=-12$

$-2x+0=-12 \quad -2x=-12 \quad x=6$

$(x,y)=(6,0)$ x-intercept

slope $m=\frac{4}{6}=\frac{2}{3}$



6. A line contains the points plotted below. Write an equation of the line in point-slope form, slope-intercept form, and general form (standard form). (5 pts)

$(4,4) \quad m=\frac{3}{4}$

$y-4=\frac{3}{4}(x-4)$ ✓

$y-4=\frac{3}{4}x-3$

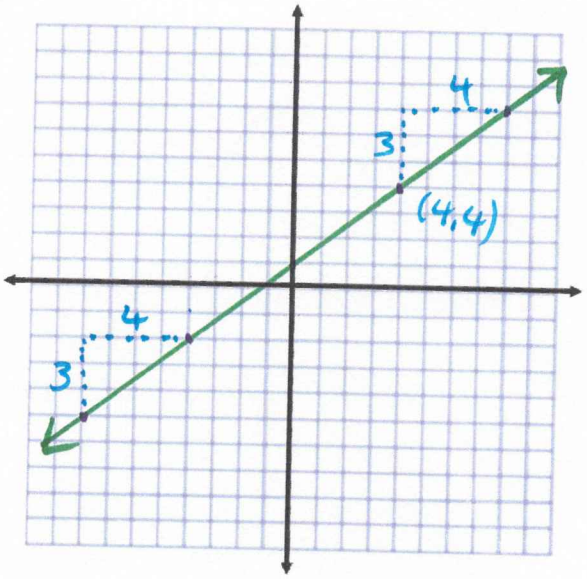
$y=\frac{3}{4}x+1$ ✓

$4y=3x+4$

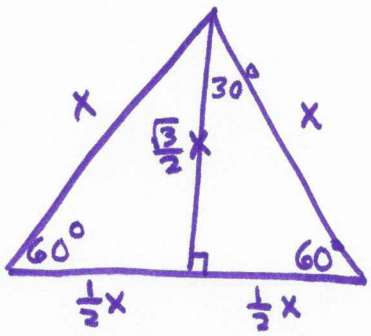
$-3x+4y=4$ ✓

or

$3x-4y=-4$



7. Write a formula for the height of an equilateral triangle as a function of its side length, x. (5 pts)



$h(x)=\frac{\sqrt{3}}{2}x$

8. Determine whether the function $m(x)=|x|-4$ is even, odd, or neither. Justify your answer. (5 pts)

$m(x) = m(-x)$ example: $m(7)=3$ $m(-7)=3$

even function since $m(x)=m(-x)$

9. Determine whether the function $k(x)=x^3+3x$ is even, odd, or neither. Justify your answer. (5 pts)

$K(x)=-K(-x)$ or $-K(x)=K(-x)$

example: $K(-1)=(-1)^3+3(-1)=-1-3=-4$

$K(1)=(1)^3+3(1)=1+3=4$

odd function since $K(x)=-K(-x)$

10. Determine whether the function $k(x)=x^2-4x$ is even, odd, or neither. Justify your answer. (5 pts)

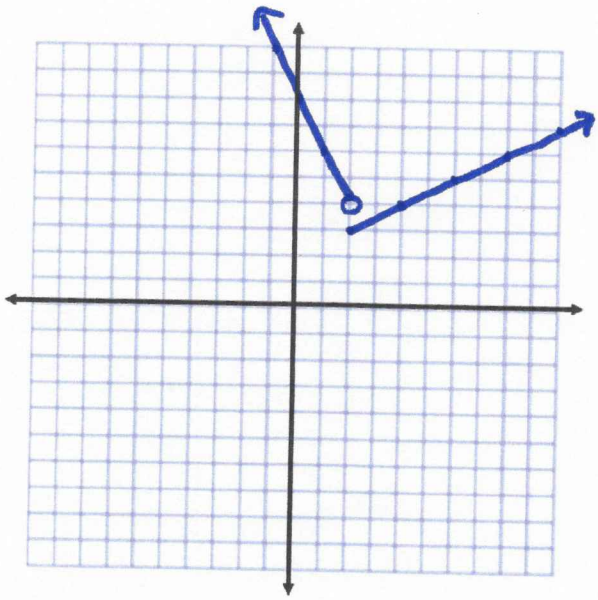
$K(3)=3^2-4(3)=-3$ $K(-3)=(-3)^2-4(-3)=21$

Therefore, $K(x)\neq K(-x)$ and $K(x)=-K(-x)$

therefore, neither

11. Given the piecewise function $f(x)=\begin{cases}-2x+8 \text{ if } x<2\\ \frac{1}{2}x+2 \text{ if } x\geq 2\end{cases}$,

a. Graph the function. (5 pts)



b. Determine the value of $f(1)$. (3 pts)

$f(1)=6$

c. Determine the value of $f(2)$. (3 pts)

$f(2)=3$

d. Determine the domain of the function. (3 pts)

D: $(-\infty,\infty$

12. Determine the zero of the exponential function $f(x)=2^x-5$. (5 pts)

Method I: graph on graphing calculator and find the x-intercept value.

$x = 2.3219281$

$f(2.3219281) = 0$

Method II: $0 = 2^x - 5$ $\quad 5 = 2^x$ $\quad \ln 5 = \ln 2^x$

$\ln 5 = x \ln 2$ $\quad \frac{\ln 5}{\ln 2} = x$ $\quad x \approx 2.321928095$

$f(2.321928095) = 0$

$\{2.322\}$

Optional Extra Credit

The population of Sunshine Gap in the year 1910 was 7,583. Assume the population increased at a rate of 3.5% per year.

a. Write a function for the population as a function of time, t, in years. (3 pts)

$A(t) = 7583(1+0.035)^t$ $\quad t =$ years since 1910

b. Use the function to determine the estimated population in 1920. (3 pts)

$t = 10$ $\quad A(10) = 7583(1.035)^{10} \approx 10,697$

c. Approximate the year when the population reached 30,000. (3 pts)

$30000 = 7583(1.035)^t$

$\frac{30000}{7583} = 1.035^t$

$3.95622 = 1.035^t$

$\ln(3.95622) = \ln(1.035)^t$

$\ln(3.95622) = t \ln(1.035)$

$t = \frac{\ln(3.95622)}{\ln(1.035)}$

$t \approx 39.98$ years

the year is about 1950